

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method of keeping a constant play back timing between a plurality of irregularly received information signal packets comprising a sequence of A/V information, the sequence including Program Clock Reference, the method comprising acts of:

determining a packet arrival time of each packet ~~of a received sequence of the~~ information signal packets (TS packet) ~~comprising A/V information using a packet arrival time counter derived from a local System Time Counter; (STC); the received sequence including, at intervals of multiple information signal packets, Program Clock Reference (PCR) information that facilitates locking the local System Time Counter (STC) with the Program Clock Reference (PCR) information;~~

—— ~~appending a Packet Arrival Timestamp (PAT) corresponding to the packet arrival time to each packet;~~

—— ~~setting the packet arrival time counter at an initial value before receiving a first information signal packet;~~

—— ~~determining a first Packet Arrival Timestamp (PAT) of the first information signal packet of the sequence and a second Packet Arrival Timestamp (PAT) of a first information signal packet that includes a Program Clock Reference (PCR) value;~~

determining ~~calculating~~ a number of counts of the local System Time Clock Counter (STC) between the packet arrival time of the first information signal packet of the sequence and the second Packet Arrival Timestamps (PAT), information signal packet that includes the Program Clock Reference; and

~~determining a System Time Counter start value (STC-start) by subtracting the number of counts from the Program Clock Reference (PCR) value to derive a start value.~~

2. (Currently amended) The method of claim 1, ~~including~~ comprising acts of:

storing the received information signal packets with the appended Packet Arrival Time Stamps (PAT) on a recording medium;₁₁ and

storing the System Time Counter start value (STC-start) as an attribute of the stored received information signal packets with the appended Packet Arrival Time Stamps (PAT).

3. (Currently amended) A method of maintaining a constant play back timing between a plurality of irregularly received information signal packets comprising a sequence of A/V information, the sequence including Program Clock Reference, the method comprising acts of:

running a ~~packet-arrival-time~~ counter derived from a local System Time Counter (STC); to indicate a packet arrival time of each of the information signal packets;

locking the ~~time counter local System Time Counter (STC) to the retrieved Program Clock Reference (PCR) information;~~₁₄

retrieving information signal packets and their corresponding packet arrival time
~~Packet Arrival Timestamps (PAT)~~ from a storage medium;
storing a number of retrieved information signal packets in a buffer;
outputting an information signal packet when the its packet arrival time
~~corresponding Packet Arrival Timestamp (PAT)~~ coincides with the packet arrival time
counter;
retrieving a System Time Counter start value (~~STC-start~~) from the storage medium,
the System Time Counter start value is determined by calculating a number of counts of the
local System Time Clock Counter between the packet arrival time of the first information
signal packet of the sequence and the information signal packet that includes the Program
Clock Reference and subtracting the number of counts from the Program Clock Reference
to derive a start value; and
setting the System Time Counter (~~STC~~) with the retrieved System Time Counter
start value (~~STC-start~~).

4. (Currently amended) The method of claim 3, further comprising an act of including
inserting Program Clock Reference (PCR) information corresponding to the System Time
Counter start value (~~STC-start~~).

5. (Currently amended) A method of maintaining a constant play back timing between a
plurality of irregularly received information signal packets comprising a sequence of AV

information, the sequence including Program Clock Reference, the method comprising acts

of:

running a presentation time counter derived from a local System Time Counter
(STC); to indicate a packet arrival time of each of the information signal packets;

locking the presentation time counter ~~local System Time Counter (STC)~~ to retrieved
Program Clock Reference (PCR) ~~information~~ corresponding to either a first sequence or a
second sequence of information signal packets ~~(TS)~~ comprising A/V information;_i

retrieving information signal packets and their corresponding packet arrival time
~~PresentationTimestamps (PTS)~~ from a storage medium;_i

storing a number of retrieved signal information packets and their corresponding
packet arrival time;_i

presenting an information signal packet when its packet arrival time the
~~corresponding Presentation Timestamp (PTS)~~ coincides with the presentation time
counter;_i

subtracting a System Time Counter start value ~~(STC-start-2)~~ of the second
sequence from a value of the Presentation Timestamp (PTS) of a first information signal
packet of the second sequence;_i and

setting the local System Time Counter ~~(STC)~~ to the value of the System Time
Counter start value ~~(STC-start-2)~~, the System Time Counter start value is determined by
calculating a number of counts of the local System Time Clock Counter between the packet
arrival time of the first information signal packet of the sequence and the information signal

packet that includes the Program Clock Reference and subtracting the number of counts from the Program Clock Reference to derive a start value.

6. (Canceled)

7. (Currently amended) ~~An apparatus~~Apparatus for recording a real time sequence of information signal packets (~~TS packet~~) comprising A/V information, on a record carrier, the serial sequence comprising at intervals of multiple information signal packets, Program Clock Reference (~~PCR~~) ~~information~~ for locking a local System Time Counter (~~STC~~) with the Program Clock Reference (~~PCR~~) ~~information~~, the apparatus comprising:

~~receiving means~~a receiver for receiving the information signal packets;

~~a time stamp generating means~~generator for generating a time stamp corresponding to an arrival time of each of the information signal packets, using a packet arrival time counter derived from a local System Time Counter; and

~~writing means~~a writer for recording the generated time stamps and information signal packets on the record carrier, the time stamp generating means provided with a system time counter locked to the received program clock reference (~~PCR~~) ~~information~~;

and

a processor for calculating a number of counts of the local System Time Clock Counter between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference and subtracting the number of counts from the Program Clock Reference to derive a start

value wherein the time stamp generating means are adapted to generate time stamps according to the method of claim 1.

8. (Currently amended) An apparatusApparatus for reproducing a real time sequence of information signal packets (TS packet) comprising A/V information recorded on a record carrier, the apparatus comprising:

reading meansa reader for reading the information signal packets recorded on the record carrier;

storing meansa storage device for temporarily storing a number of information signal packets read from the record carrier;

a time stamp generation meansgenerator comprising a Packet Arrival Time counter derived from a local System Time Counter (STC), to indicate a packet arrival time of each of the information signal packets; and

a comparator meansfor comparing a stored time stamp of an information signal packet with the generated Packet Arrival Time value, and outputting an information signal packet from the storing means when a Packet Arrival Time Counter value coincides with the corresponding time stamp, the System Time Counter start value is determined by calculating a number of counts of the local System Time Clock Counter between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference and subtracting the number of counts from the Program Clock Reference to derive a start valuecharacterized in that, the time

~~stamp-generating means are adapted to generate a Packet Arrival Time according to the method of claim 3.~~

9. (Currently amended) A method ~~Method~~ of storing a real time sequence of information signal packets comprising A/V information, on a record carrier, the sequence comprising Program Clock Reference (PCR) ~~information~~ for locking a local System Time Counter (STC), Presentation Time Stamp (PTS) ~~information~~ for determining the presentation time of the information comprised in the information signal packets, Decoding Time Stamp (DTS) ~~information~~ for determining the decoding time of the information comprised in the information signal packets, and Packet Identification (PID) ~~mapping~~ information, the method comprising acts of:

adding mark points at specific entry points in the sequence;

storing the mark point and one or more of the ~~following~~ information entities: selected from at least one of Program Clock Reference (PCR) ~~information~~, Presentation Time Stamp (PTS) ~~information~~, Decoding Time Stamp (DTS) ~~information~~, and Packet Identification (PID) ~~mapping~~ information,

wherein a packet arrival time of each of the information signal packets is determined using a packet arrival time counter derived from a local System Time Counter and a number of counts of the local System Time Clock Counter is calculated between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference.

10. (Previously presented) The method of claim 9, wherein the entry points include Iframes in an MPEG sequence of encoded frames.

11. (Previously presented) The method of claim 1, wherein the received sequence corresponds to a sequence of MPEG encoded frames.

12. (Previously presented) The method of claim 3, wherein the received sequence corresponds to a sequence of MPEG encoded frames.

13. (Currently amended) A system for maintaining a constant play back timing between a plurality of irregularly received information signal packets comprising a sequence of A/V information, the sequence including Program Clock Reference, the system comprising:

a receiver that is configured to receive a~~the~~ sequence of information signal packets, the received sequence including, at intervals of multiple signal packets, program clock reference information,

a timestamp generator that is configured to provide a packet arrival timestamp corresponding to each information signal packet,

a combiner that is configured to append the packet arrival timestamp to each corresponding information signal packet, and

a packet detector that is configured to detect a program clock reference value in a clock referencing information signal packet that includes program clock reference

information, and to determine a packet arrival time of each of the information signal packets using a packet arrival time counter derived from a local System Time Counter

wherein the timestamp generator is configured to provide a system time start value based on the program clock reference value and a time difference between the clock referencing information signal packet and an initial information signal packet, and the combiner is configured to associate the system start time with the sequence of information packets, and wherein a number of counts of the local System Time Clock Counter is calculated between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference; and the number of counts is subtracted from the Program Clock Reference to derive a start value.

14. (Previously presented) The system of claim 13, including a writer that is configured to write the sequence of information packets with appended packet arrival timestamps and associated system start time to a recording medium.

15. (Previously presented) The system of claim 14, wherein the sequence of information packets correspond to a sequence of MPEG-encoded packets, and the system start time is recorded as a segment attribute.

16. (Previously presented) The system of claim 13, wherein the timestamp generator includes an oscillator, a system counter, operably coupled to the oscillator, that is

configured to provide a local clock reference, a phase detector that is configured to control an output of the oscillator based on a comparison of the local clock reference to the program clock reference value, and a packet timestamp generator, operably coupled to the output of the oscillator, that is configured to provide the packet arrival timestamps.

17. (Currently amended) A system for maintaining a constant play back timing between a plurality of irregularly received information signal packets comprising a sequence of AV information, the sequence including Program Clock Reference, the system comprising:

a reader that is configured to read a sequence of information packets and an associated system start time, each packet of the sequence of information packets including a corresponding packet arrival timestamp, and select packets including a program clock reference value,

a buffer that is configured to store the sequence of information packets, and

a controller that is configured to control an output of the buffer to provide the sequence of information packets in a time sequence that is dependent upon the system start time and the packet arrival timestamps,

wherein the controller determines a packet arrival time of each of the information signal packets using a packet arrival time counter derived from a local System Time Counter, calculates a number of counts of the local System Time Clock Counter between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference; and subtract the number of counts from the Program Clock Reference to derive a start value.

18. (Previously presented) The system of claim 17, including a timestamp generator that is configured to provide a local timestamp for each information packet based on the system start time,

wherein, the controller is configured to provide the output of the buffer based on a comparison of the local timestamp and the packet arrival timestamp of each information packet.

19. (Previously presented) The system of claim 18, including a demultiplexer, operably coupled to the controller and the timestamp generator, that is configured to extract the system start time, the program clock reference value, and the packet arrival timestamps from the sequence of information packets.

20. (Previously presented) The system of claim 18, wherein the timestamp generator includes an oscillator, a system counter, operably coupled to the oscillator, that is configured to provide a local clock reference, a phase detector that is configured to control an output of the oscillator based on a comparison of the local clock reference to the program clock reference value, and a packet timestamp generator, operably coupled to the output of the oscillator, that is configured to provide the local timestamps,

wherein the controller is configured to set the system counter to an initial value corresponding to the system start time.

21. (Previously presented) The method of claim 5, wherein the first and second sequences correspond to sequences of MPEG-encoded frames.